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A neurological examination has been developed to discover children with physiologically based learning problems who do not manifest asymmetrical functioning. This study attempts to determine the validity of this examination by its accuracy in predicting the performance of children in a summer Head Start program. Validity was determined by comparing the examination results with results of the Metropolitan Readiness Test (MRT) and then testing both groups of predictions by examining the actual performance of the children on the criterion measures; that is, the achievement tests. The subjects of this study were 43 first grade Negro children, half of which had participated in a summer Head Start program and all of which represented a population meeting the criteria for funding by the Office of Economic Opportunity (OEO), and 45 Negro first grade children who were from schools not meeting the OEO criteria. Both groups were administered the Neurological Screening Test, the MRT, certain tests from the Stanford Achievement Battery, and various psychological tests. Although the results of this study indicate that the neurological test was not consistently as good a predictor of school performance as the MRT, it did demonstrate it had predictive value. It should be noted that the neurological test takes about 15 minutes to administer while the MRT takes one to two hours. (WD)

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FINAL REPORT:

A STANDARDIZED NEUROLOGICAL EXAMINATION: ITS VALIDITY IN PREDICTING SCHOOL ACHIEVEMENT IN HEAD START AND OTHER POPULATIONS.

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I. Introduction

The Head Start Program was developed to deal with the high incidence of school failure in the lowest socio-economic group. The rationale was that one should begin to deal with this problem by supplementing the preparation that the child receives prior to school entry. One of the focal points has been to provide adequate screening of medical problems that might interfere with school achievement. In addition to the obvious difficulties inherent in malnutrition and physical disability, brain dysfunction is eminently relevant to school performance. The higher incidence of school failure of the child from lower socio-economic groups may be not solely a function of relatively inferior home training and poor school programming. Studies such as those of Pasamanick et al[1-3] have pointed out the increased incidence of brain dysfunction related to prematurity and poorer prenatal care in lower income groups. "Learning problems" have been considered to be along the continuum of brain dysfunction and have been similarly related to prenatal and perinatal insults.[4]

The usual medical screening examination on school entry has been concerned with picking up more obvious physical disabilities. The examination of brain function is an important aspect of the screening examination, and one which is particularly relevant to what school is about. A measure of brain function was designed as a screening instrument on school entry to be administered by pediatricians and school health physicians. It is short, lasting 10-15 minutes, standardized and scorable. The use of this instrument might make it possible to identify those children who are at risk for learning problems at the earliest time, and would help to delineate the severity of the problem so that more appropriate planning could be effected.

Levels of function at school entry might be looked on as a result of both the physiologic substrate available for programming as well as the skill and the choice of repertoire provided by the parent as a teacher. Levels of cognitive development are considered to be measures of brain function. The bias is that failure to meet various developmental criteria is not a result of poor interpersonal relationships or other components of emotional growth. In most cases the stunting of emotional growth may be the effect rather than the cause. A child who has not learned skills of language may not have had the means by which he can develop interpersonal relationships that are satisfying. One is therefore primarily concerned with what might be "neurologic" rather than "psychiatric" as the underlying pathogenesis of the child's difficulties in learning cognitive skills.

On the other hand, the assumption is not that of genetic or other determinism of the child's growth in cognitive skills. Brain function is being assessed and no implication is made that a child whose level of function has not met criterion is irreparably damaged and unlikely to meet criterion. His level of performance may be a function of relatively poor programming of an organism with varying degrees of difficulty in handling various types of inputs. The particular qualities of the child are a function of these individual differences. The first fact to be established is that his performance is not at a

level commensurate with age specific requirements. The onus is then on the school system or family to provide more effective, explicit programming of the behaviors sought with recognition of the individual needs. The use of a screening instrument is not merely to label children as not being able to "make it". It is rather to identify the way the child might "make it". The goal is to identify the areas of relatively good function as well as dysfunction which would then permit more explicit programming in light of the child's needs.

The Head Start program was designed to delineate the specific needs of children of low socio-economic background so that appropriate programs of remediation might be instituted. The examination of brain function must be standardized and scorable for it to be reproducible in delineating the specific needs of the individual child. It must also be more relevant to the process it is trying to predict and modify. A traditional measure of brain function has been motor performance. Neurological dysfunction has been determined by the presence of asymmetrical function such as hemiparesis. The standard clinical neurologic examination has evolved from concern with relatively acute neurological disease in the adult. The large majority of children with a physiological basis for learning problems do not have asymmetrical performance of this sort. The effects of putative insult to the brain are generally bilateral and diffuse in effect. Concern with motor function should then be in terms of levels of function rather than asymmetrical performance. Large scale evaluation of children's motor performance would require the use of a standardized, scorable format that would focus on the associated movements and discreteness of motor patterning. However, motor performance is but one measure of brain function and may, indeed, be irrelevant to the process of learning many of the school types materials.

A relevant examination of brain function then should include the ability to handle sensory inputs of a visual, auditory and kinesthetic nature. Moreover, to make the neurological evaluation more relevant to the process one is trying to predict, one may sample in the clinical setting the very process of learning. The rate of learning of materials in these various channels in the clinical setting may provide a more dynamic predictor of learning in the school setting over a much longer period of time.[5]

A neurological examination was developed for use in Head Start in 1965. A pilot study involved a group of approximately 80 children in several Head Start centers in Washington, D. C.[6] The purpose was to determine the validity of this neurological examination by its accuracy in predicting performance in a summer Head Start program. The children were examined at the start of the summer program by an early version of the neurological form. At the end of the program, school achievement tests and standard psychological tests were administered. These included the Stanford-Binet and Peabody Picture Vocabulary Test.[7] A Home Environment Questionnaire was also designed to measure this additional parameter which may contribute to the child's school performance.

This preliminary study indicated that poor performance on the standardized, scorable motor examination, which was part of the battery of tasks on the neurological examination, delineated a group of children whose school performance was also significantly below the mean of the entire cohort. In addition to the group aboye, another group emerged which might be regarded as "false positives". That is, they were identified on the motor portion of the neurological examination as being at risk for school achievement, but they were not so identified on the basis of their school performance. Analysis of the home environment revealed that this group was characterized as children from the best organized and most "verbal" homes. Another small group of "false negatives" were found whose school performance was significantly poorer but whose motor score was adequate. Analysis of the home environment indicated that these children were from the worst organized homes in the sample.

During the subsequent school year, a portion of this original Head Start Cohort was matched with a group not enrolled in Head Start. The achievement of the two groups was compared on standardized Readiness and other performance tests at the end of the kindergarten year. The two groups were matched as to age and sex and classroom and presumably came from equivalent socio-economic background. No significant differences were found between the two populations.[8]

It appeared to be desirable to investigate the value of this neurological instrument for the prediction of school achievement in the entire group of low socio-economic background over several years of follow-up. The concurrent and predictive validity of these measures were also assessed in a contrast population derived from a public school more representative of the entire school population of the District of Columbia. One may then determine the relationship of socio-economic status to both school performance as well as the value of the neurological examination in various settings. Correlations were to be made between this screening instrument and other screening instruments presently used by the schools of the District of Columbia. The measures of performance against which the neurological examination was to be validated consisted of teacher observations, level of reading and standardized tests at the end of 1st grade. These tests included the Stanford Achievement Battery, PPVT, Bender-Gestalt and part of the ITPA. It was felt that these performance tests were more relevant than the usual intelligence tests such as the Stanford-Binet.

II. Method

A. Subjects

Two groups of Negro pupils, enrolled in the District of Columbia school system, served as subjects in this study. The first group consisted of 49 children attending first grade in three separate elementary schools which met the criteria for funding by the Office of Economic Opportunity. Approximately half of this group had attended the Head

Start program in the Summer of 1965 and had served as subjects in the pilot study of the neurological examination. The second half had not attended the Head Start program but had been matched with the first group for a follow-up study of the neurological examination at the end of their kindergarten year. Originally, there had been 40 pairs of subjects, matched on the basis of age, sex, school and family income. By the time the present study was completed (end of the first grade) only 49 of these 80 Ss could be located for testing. These residual Ss were representative of the larger group in terms of Metropolitan Readiness Test performance: the median percentile score of both groups approximated the 25th percentile. 43 of these 49 had all studies performed and form the basis of the OEO group.

The second group of Ss consisted of 45 pupils randomly selected from the first grade population of an elementary school which did not meet the economic criteria for funding by Office of Economic Opportunity. The particular school was chosen because it appeared representative of the entire urban school population in terms of socio-economic variables (i.e. distribution of family income, parent education and occupational levels). This sample was introduced into the study as a "Contrast" group relative to the group of primary concern, the OEO group.

B. Tests and Procedure

The Neurological Screening Test was the major predictor in this study. A copy of the neurological examination is presented as Appendix I together with the format and instructions for administration and scoring. The Metropolitan Readiness Test is used routinely in the District of Columbia school system and was included in this study as the second predictor task. Correlations between scores on this test and subsequent achievement test scores are reported in the test's manual of instructions. These correlations are generally in the range of .6 to .7 and are certainly adequate as regards predictive validity. It was felt that the Metropolitan would provide a reasonable measure for studying concurrent validity of the neurological test. The Metropolitan Readiness test, as the standard, could be compared with the neurological examination in terms of predictive validity.

Metropolitan scores were available for the majority of Ss from the routine administration at the end of their kindergarten year. Ss in the OEO group were given the neurological test during essentially the same period. For the majority of Ss in the CONTRAST group, the same procedure could be followed. However, some of the Ss in the CONTRAST group were not given the Readiness test until the beginning of first grade. These Ss also received the neurological test at this later date. The Metropolitan was administered to small groups of Ss (circa 10) by the pupil's teachers with help from other school personnel, in a fashion recommended by the test publisher. The Neurological was administered on an individual basis by the principal investigator, previously unknown to the Ss.

Ten criterion measures were used in this study. Four standardized achievement tests were selected from the Stanford Achievement Battery,

Primary I: Word Reading, Spelling, Arithmetic, and Vocabulary. The Stanford Achievment Battery was used rather than the Metropolitan Achievement Battery so as to have an independent measure of the Metropolitan Readiness test. The sub-tests of the Stanford Battery were selected on the basis of relative efficiency of administration. An independent set of "school data" was also obtained for each S: Current School Placement, Recommendation for Placement, and Current Reading Level. Appendix II is a copy of this form with indications for scoring by the classroom teacher. Brief interviews were occasionally required to clarify responses. Three standardized psychological tests were also used as criterion measures: Peabody Picture Vocabulary Test; Bender-Gestalt (Koppitz scoring); and the Auditory-Vocal Association Test (verbal analogies) from the Illinois Test of Psycholinguistic Abilities. Inclusion of these three "psychological type" measures sampled language as well as visual motor skills. A wide range of school type behaviors could be investigated by inclusion of these ten measures including performance in groups as well as on individual basis.

The Psychological test battery was administered in individual sessions of approximately 30 to 45 minutes duration. Achievement test data were obtained in different fashion for the two groups. In the CONTRAST group, all Ss in the first grade were administered the four tests of the Stanford Achievement Battery. Testing was performed over a three day period and occurred in the large group setting of the classroom (N=25-30). As with the Metropolitan Test, the classroom teachers aided by other school personnel administered the Stanford tests to their pupils. In the OEO group, only Ss in this study received the Stanford Battery at the end of first grade. Testing occurred at the Ss respective schools but was in a small group setting (about 6-10 in a group). The Stanford tests were administered by the junior investigator who was previously unknown to the Ss. Testing was usually completed during two sessions and frequently within the same day.

Relationships among the various tests were evaluated by Pearson product-moment correlations as calculated by computer program. In the Results section to follow, correlations are reported for the OEO group (N=43), for the CONTRAST group (N=45) and for the TOTAL group (N=88). Variables included the total Metropolitan Readiness test total score, 8 neurological sub-test scores and 12 criterion scores. The terms "significant" and "statistically significant" are used repeatedly in describing the coorelations coefficients presented. These terms refer to rejection of the null hypothesis that correlations are zero. The levels of significance used are .05 and .01; values of p associated with a one-tailed test of significance were used. These values were taken from Edwards[9], p. 362, and read as follows:

For OEO: $r > .26$, $p < .05$
d.f. = 41 $r > .36$, $p < .01$

For CONTRAST: $r > ,24$, $p < .05$
d.f. = 43 $r > .43$, $p < .01$

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For TOTAL: $r > .17$, $p < .05$
d.f. = 88 $r > .24$, $p < .01$

Because correlations of lesser magnitude satisfy criteria for significance in the TOTAL group than in either sample, the number of significant correlations in this group approaches 100%.

III. Results

A. Concurrent Validity

Pearson correlations between each of the eight measures of the neurological test and the Metropolitan Readiness Test total score are presented in Table 1 for each sample and for the TOTAL group of Ss. In general, the correlations are statistically significant but not large in magnitude. Only two correlations are equal to .50 and these involve Cross Mid Line and Face Hand tests for OEO Ss. For this same group of Ss, the two other correlations also significant at .01 level are Total Consistency score and Sound Touch test. In the CONTRAST group, all eight correlations are significant. The CONTRAST group generally yields a greater number of significant correlations than does the OEO group.

TABLE 1

Correlations between Neurological Screening Test (8 Sub-tests) and Metropolitan Readiness Test for Each Group.

SUBTEST	OEO	CONTRAST	TOTAL
Intelligibility	.07	.45**	.36**
Total # Correct	.22	.27*	.24**
Total # Consistent	.45**	.36**	.42**
Cross Mid Line	.50**	.37**	.45**
Face Hand	.52**	.31*	.28**
Sound Touch	.37**	.35**	.31**
Visual Figure Grd.	.19	.40**	.36**
Motor	.06	.31*	.23*

* $p \leq .05$
** $p < .01$

B. Predictive Validity: Achievement Tests

Correlations between the predictor measures (Metropolitan total score and each of the neurological sub-tests) and four achievement test measures are presented in Table 2. Seventy-five percent or 81 of 108 of these correlations are statistically significant: 19 of 36 in the OEO group, 27 of 36 in the CONTRAST group, and 35 of 36 for TOTAL Ss.

TABLE 2

Correlations between Predictor Measures and Stanford Achievement Tests for Each Group

	OEO				CONTRAST				TOTAL			
	Word Reading	Vocabulary	Spelling	Arithmetic	Word Reading	Vocabulary	Spelling	Arithmetic	Word Reading	Vocabulary	Spelling	Arithmetic
Metropolitan	.33*	.43**	.56**	.67**	.66**	.60**	.76**	.86**	.61**	.57**	.72**	.82**
Intelligibility	.08	.40**	.01	.12	.43**	.45**	.30*	.39**	.33**	.46**	.23*	.32**
Total # Correct	.08	.26*	.26*	.14	.25*	.29*	.29*	.29*	.19*	.27**	.27**	.24**
Total # Consistent	.25	.36**	.36**	.41**	.29*	.16	.38**	.37**	.30**	.27**	.40**	.41**
Cross Mid Line	.11	.39**	.25	.32*	.33*	.42**	.32*	.39**	.27**	.44**	.33**	.38**
Face Hand	.32*	.46**	.45**	.46**	.11	.08	.16	.29*	.13	.19*	.21*	.28**
Sound Touch	.23	.41**	.29*	.34*	.21	.30*	.18	.27*	.20*	.33**	.20*	.27**
Vis. Figure Grd.	.12	.16	.09	.01	.14	.22	.22	.24*	.17*	.24**	.21*	.19*
Motor	.11	.22	-.01	.12	.30*	.31*	.35**	.38**	.24**	.29**	.22*	.28**

* $p < .05$
** $p < .01$

Correlations between the Metropolitan and the achievement tests are all significant at .01 level with the exception of word reading in the OEO group ($p < .05$). The correlations reported for CONTRAST and TOTAL Ss clearly support the predictive validity of the Metropolitan Readiness Test: r's range from a low of .57 for Vocabulary in the TOTAL group to a high of .86 for Arithmetic in the CONTRAST group. Correlations are somewhat lower for OEO Ss: r's range from a low of .33 for Word Reading to a high of .67 for Arithmetic. Here, although the correlations are generally significant, the magnitude of correlation is considerably poorer in the OEO group. The magnitude of the predictive correlation of the Metropolitan Readiness test at the start of 1st grade to performance at the end of 1st grade on the Metropolitan Achievement Battery as reported[10] is described in table 2A. One may note that the correlations found in the CONTRAST group are much more comparable to those reported in other populations.

TABLE 2A

Summary of Correlations Between Metropolitan Readiness Test and Metropolitan Achievement Tests in Six Groups.

ACHIEVEMENT TESTS	Range of r's	Median
Word Knowledge	.62 - .73	.67
Word Discrimination	.54 - .69	.62
Reading	.60 - .73	.65
Arithmetic Concepts and Skills	.58 - .70	.64

Reference to Table 2 shows a large number of significant correlations between neurological and achievement tests. Of the 32 coefficients reported for each group, 15 were significant at .05 level or better for OEO Ss, 23 reached significance for CONTRAST Ss and 31 were significant for TOTAL Ss.

In the OEO group, the Face-Hand test, Total # Consistent and Sound-Touch yielded significant correlations with at least three of the four criterion measures. The greatest degree of correlation was between the neurological sub-test scores and the vocabulary sub-test of the Stanford Battery with 6 out of 8 correlating significantly at least .05 level and 5 of those at .01 level. The Spelling and Arithmetic sub-tests correlated significantly with 4 of the neurological sub-tests with 2 of these at .05 and 2 at .01 level. The poorest correlation was found between the neurological sub-tests and Word Reading. Only the face-hand sub-test correlated and that at .05 level of significance. This was the same range of significant correlation between the Metropolitan score and this particular sub-test.

In the CONTRAST group, Intelligibility, Crossing Mid Line and the Motor test yield significant correlations with all four achievement tests. Total Correct and Total Consistent yield at least three significant correlations. The greatest degree of correlation was between the neurological sub-test scores and the arithmetic sub-test of the Stanford Battery with all 8 correlating significantly at .05 level and 4 of these at .01 level. The other correlations are significant in at least 5 out of 8 instances with the poorest correlation on the Word Reading sub-test. This relatively poor correlation of Word Reading was also found in the OEO group. Again, as with the Metropolitan concurrent validity, the degree of correlation was considerably better in the CONTRAST than OEO group between the neurological sub-tests and achievement sub-tests.

In comparing the predictive validities of the two measures -- Metropolitan and neurological -- it is clear that the Metropolitan total score correlates more consistently and to a greater degree with individual achievement test scores than does any single neurological measure. An exception could be cited in the case of the Face-Hand test which yielded correlations fairly comparable to that of the Metropolitan with all four achievement tests in the OEO group. In that Stanford sub-test that the face-hand test predicted poorly, the Metropolitan Total Score also predicted equally poorly. The magnitude of predictibility of the Total # Consistent was poorer than the Metropolitan but it again predicted at .01 level in three out of four achievement scores.

The magnitude of correlation between the Metropolitan total score and school achievement was much greater in the CONTRAST group than the OEO group. The individual neurological sub-tests did less well in magnitude of correlation in the CONTRAST population and in no case approached that of the Metropolitan.

C. Predictive Validity: School Data

Table 3 presents the correlations between the predictor measures for each group. Approximately 69% of the correlations are significant: 12 in the OEO group, 19 in the CONTRAST group, and 25 of 27 in the TOTAL group. With the exception of the correlation with current placement for OEO Ss, all Metropolitan correlations are significant at the .01 level of confidence. Predictions of current placement and reader are impressive for the CONTRAST Ss in particular ($r = .73$, $r = .74$, respectively). As was true of the achievement data reported in Table 2, the correlations between Metropolitan and school data measures are relatively greater for CONTRAST Ss than for OEO Ss. Next placement has the poorest range of correlation.

Of the correlations between neurological sub-test scores and criterion measures, 10 of 24 reach statistical significance in the OEO group, 16 of 24 are significant in the CONTRAST group, and 22 of 24 are significant in the TOTAL group. Both current placement and reader yield a consistently greater number of significant correlations with neurological tasks across the three groups than does next placement. Of the neurological sub-tests in the OEO group, the face-hand and sound-touch tests are the most predictive of actual school performance. The Total # Consistent provides

TABLE 3

Correlations between Predictor Measures
and School Data for Each Group.

	OEO			CONTRAST			TOTAL		
	Current	Next	Reader	Current	Next	Reader	Current	Next	Reader
Metropolitan	.23	.37**	.40**	.73**	.42**	.74**	.54**	.39**	.67**
Intelligibility	.05	.36**	.16	.30*	.33*	.46**	.18*	.35**	.38**
Total # Correct	.19	-.10	-.04	.26*	.20	.33*	.24**	.07	.17*
Total # Consistent	.35*	.22	.27*	.18	.24*	.32*	.22*	.24**	.34**
Cross Mid Line	.31*	.18	.19	.39**	.13	.35**	.31*	.17*	.34*
Face Hand	.41**	.39**	.46**	.15	.15	.21	.25**	.24**	.22*
Sound Touch	.34*	.37**	.34*	.36**	.09	.39**	.34**	.23*	.32**
Motor	.06	.21	.10	.28*	.32*	.33*	.18*	.27**	.25**
Vis. Figure Grd.	.18	-.08	.17	.41**	-.03	.31*	.29**	-.03	.31**

* p .05
** p .01

some predictability at the .05 level alone. In the CONTRAST group as with the achievement scores on the Stanford Battery, the total number of correlations is greater. The neurological sub-test scores providing the best correlations are intellibility, cross mid line, sound-touch test and visual figure ground. The motor score becomes predictive at the .05 level here in the CONTRAST group again as it did in relation to the standardized achievement scores.

A comparison of Metropolitan and neurological correlations with school data, as reported in Table 3, reveals that the Metropolitan yields correlations of greater magnitude in the CONTRAST and TOTAL groups, for the variable of current placement and reader. Although the majority of correlations between the neurological sub-test scores and these two criterion measures are clearly significant, none of these correlations are greater than .50. For OEO Ss, several of the neurological tests yield correlations that are equivalent to or greater than those found for the Metropolitan. Correlations between the Face Hand and Sound Touch tests on the one hand and the criterion measures on the other are all statistically significant and comparable to those for the Metropolitan. Indeed, the Face-Hand test seems to predict somewhat better than the Metropolitan in the OEO group.

D. Predictive Validity: Psychological Data

Correlations between predictor and psychological measures are summarized in Table 4. In comparison to previous tables, fewer correlations are statistically significant in this table. In the OEO group only 10 of 27 correlations between predictor and psychological measures reach significance. In the CONTRAST group, 10 of 27 correlations involving these measures are significant. For the TOTAL group, 18 of 27 are significant.

The Metropolitan correlations are significant in the range of .50 in the OEO group for the Bender (Koppitz scoring). The negative correlation is of course the result of increasing score on the basis of number of errors on the Koppitz scale. Relatively poor correlation, but in the significant range, is found with verbal analogies sub-test of the ITPA. The correlations are quite good for both these tests in the CONTRAST group. The PPVT does not correlate significantly in either group.

The range of correlations for the neurological measures is generally greater than for the Metropolitan in the OEO group. Here again the neurological appears to predict behavior in the OEO group better than the Metropolitan. It may be noted that both the neurological and the psychological testing were done on an individual basis rather than the group basis of the Metropolitan. The greatest degree of correlation is with the complex verbal behavior required on the verbal analogies sub-test of ITPA with Crossing Mid-Line, Face-Hand test and Sound-Touch tests all significant. Intelligibility, Crossing Mid-Line and Sound-Touch also correlate significantly with performance on the PPVT. It is rather surprising that the correlation

TABLE 4

Correlations between Predictor Measures
and Psychological Tests for Each Group

	OEO			CONTRAST			TOTAL		
	Bender	PPVT	Verbal	Bender	PPVT	Verbal	Bender	PPVT	Verbal
Metropolitan	-.45**	.16	.28*	-.55**	.20	.50**	-.51**	.23*	.46**
Intelligibility	-.15	.32*	.23	-.21	.33*	.31*	-.21*	.36**	.33**
Total # Correct	-.20	.22	.12	.04	.22	-.02	-.07	.22*	.05
Total # Consistent	-.43**	.24	.06	-.23	-.25*	.26*	-.34**	.00	.21*
Cross Mid Line	-.25	.31*	.36**	-.34**	.17	.41**	.32**	.28**	.44**
Face Hand	-.22	-.07	.33**	-.03	-.25*	.15	-.09	-.20*	.16
Sound Touch	-.15	.36**	.28*	-.15	.01	.01	-.15	.18*	.14
Vis. Figure Ground	-.19	.18	.17	-.14	.00	.16	-.20*	.13	.24**
Motor	-.21	.24	.30*	-.18	.01	.33*	-.21*	.14	.33**

with the Bender, albeit in the same range as the Metropolitan, is tapped by only one sub-test and that # consistent rather than the other more purely visual and motor tasks.

In the CONTRAST group, the range of correlations is poorer for the neurological sub-test scores than for the Metropolitan total score. The greatest degree of correlation, as with the OEO group, is found with the verbal analogies sub-test. Crossing mid-line correlates best with this as it did the OEO sample. The number of sub-test scores correlating with verbal analogies is greater than for OEO sample with Intelligibility, Total Consistent and motor scores all in .05 range of significance. The only significant correlation with the Bender is found in the Crossing Mid-Line score. There is no significant correlation, again, with the more purely visual and motor scores, minor significant correlations are found to the PPVT with Intelligibility, Total # Consistent and the Face-Hand test.

In comparing the neurological sub-tests and the Metropolitan in terms of level of correlation, the latter generally has a higher magnitude of correlation. The magnitude of correlation with the PPVT is superior in the neurological sub-tests in both population and with the verbal analogies in the OEO group. The correlation between the Bender and the neurological is comparable to that of the Metropolitan in the OEO population but of a lesser degree in the CONTRAST population.

E. The "Non-Motor" Score

In previous sections the concurrent and predictive validities of the neurological screening test have been examined by studying relationships between eight neurological subtests on the one hand and various criterion measures on the other. Correlations presented thus far have involved neurological subtest scores only. This is despite the fact that certain sub-tests are extremely brief in nature and present an extremely limited range of scores. For example, performance on Face-Hand or Sound-Touch requires 2 minutes on the average and is rated by scores of 0, 1, 2 or 3.

An approach was made toward a total or summary score by adding Ss' scores on seven of the eight sub-tests, the Motor test being excluded. Thus, the summary scores was labelled "Non-Motor". It represents the sum of scores on Intelligibility, Total # Correct, Total # Consistent, Cross Mid Line, Face-Hand, Sound-Touch, and Visual Figure Ground. These scores were added despite the fact that certain of the sub-test scores appeared to have greater predictibility than others. The goal was to determine the predictive validity of the instrument as presently constituted. One may note that the correlation between "motor" and "non-motor" score is not significant in the OEO group but is, at the .05 level, in the CONTRAST group. Table 5 presents correlations between the Non-Motor score and selected criterion measures (achievement tests and reading level) for the OEO Ss. Correlations between the Metropolitan and the Motor scores and these same criterion measures are again presented here.

5. Correlations between Metropolitan, Non-Motor, and Motor Scores and Selected Criterion Measures for OEO Group.

	Word Reading	Vocabulary	Spelling	Arithmetic	Reader	Metropolitan
Metropolitan	.33*	.43**	.56**	.67**	.40**	
Non-Motor	.26*	.51**	.45**	.41**	.71**	.53**
Motor	.11	.22	-.01	.12	.10	.06

* $p < .05$
** $p < .01$

6. Correlations between Metropolitan, Non-Motor and Motor Scores and Selected Criterion Measures for CONTRAST Group.

	Word Reading	Vocabulary	Spelling	Arithmetic	Reader	Metropolitan
Metropolitan	.66**	.60**	.76**	.86**	.74**	
Non-Motor	.38**	.70**	.49**	.53**	.54**	.56**
Motor	.30*	.31*	.35**	.38**	.33*	.31*

* $p < .05$
** $p < .01$

1. CONCURRENT VALIDITY OF NON-MOTOR SCORE.

It may be recalled from Table 1 that concurrent validity between the Metropolitan total score and sub-test scores in the OEO population was in the range of .50 in only 2 instances. The entire non-motor score has an improved magnitude of correlation with a correlation significant at .01. The motor score has no significant correlative relationship to the Metropolitan in the OEO group. In the CONTRAST group, the magnitude of correlation between the Metropolitan total score and sub-test scores was generally of lesser magnitude than in the OEO group. The use of the total non-motor score provides a magnitude of correlation of .56, significant at the .01 level. The motor score also approaches significance in this population at .05 level.

2. PREDICTIVE VALIDITY OF NON-MOTOR SCORE TO ACHIEVEMENT TESTS.

In the OEO group the magnitude of correlation between the non-motor score and achievement tests has been considerably enhanced and compares favorably with the Metropolitan total score (refer to Table 2 for that provided by sub-test scores). The greatest magnitude of correlation is to the vocabulary sub-test of the Stanford Battery. The magnitude of correlation to Word-Reading is poorest but is in the range of that provided by the Metropolitan and is significant at the .05 level. The motor score does not have any significant correlation to the achievement test scores.

In the CONTRAST group, the non-motor score develops magnitudes of correlation considerably better than that provided by individual sub-test scores and are all significant at .01 level. Again, the poorest degree of correlation is to Word-Reading sub-test of the Stanford Battery. The greatest degree of correlation is to the vocabulary sub-test. The motor score provides significant correlations for all 5 sub-tests in this context with .01 degree of significance in Spelling and Arithmetic. The degree of correlation found in the CONTRAST group is again generally better than for the OEO group. The range of correlation is also excellent between the Metropolitan and school achievement in this population and is superior to that provided by the non-motor score with the exception of the vocabulary sub-test.

3. PREDICTIVE VALIDITY OF NON-MOTOR SCORE TO ACTUAL READER LEVEL.

In the OEO group, the predictive validity of the non-motor score to the actual reader level is .71. This compares with a correlation of .40 between the Metropolitan and reader level. The neurological thus serves to predict performance better in the OEO group than the Metropolitan. In the CONTRAST group, the neurological non-motor score correlation to reader level is of lesser magnitude than that provided by the Metropolitan. The motor score also becomes a significant predictor but at a .05 level.

Summary

Data presented in this section were concerned with the validity of the neurological examination as a measure for predicting school performance. Relationships between neurological sub-tests and criterion tasks were examined in two independent samples by correlational analysis. Results were consistent in revealing a large number of significant correlations between the neurological sub-tests and other measures. In general, the Metropolitan total score was more highly correlated with the criteria measures than the individual neurological sub-test scores. The range of correlation was poorer for the Metropolitan in the OEO population than in the CONTRAST population. In the OEO group, in several instances, individual neurological sub-test scores correlated with eventual performance to a greater degree than the Metropolitan total score. Greater degree of correlation was found between the neurological sub-tests and various performance measures in the CONTRAST population than in the OEO group but to a lesser degree than that provided by the Metropolitan. The motor score also becomes predictive to a significant degree in the CONTRAST population.

When a composite non-motor score was utilized, the degree of correlation was in the range of .53 - .56 with the Metropolitan total score. In general, the correlations with criterion measures were considerably enhanced and become quite comparable to that provided by the Metropolitan in the OEO group. In the CONTRAST group, the degree of correlation is also enhanced but does not surpass that provided by the Metropolitan total score, except in one instance. The neurological sub-tests seem to be sampling performance on these "psychological type" tests better in the OEO group than in the CONTRAST group. Both the neurological and the Metropolitan appear to be sampling behavior relevant to school performance to a greater degree than so called "psychological function".

IV. Discussion

The purpose of this study is to explore the concurrent and predictive validities of an experimental clinical instrument. Early studies had indicated considerable predictive value over a relatively short period of time in a Head Start program. This study concerned itself with the value of such an instrument applied at the end of kindergarten or start of 1st grade in predicting performance across that crucial 1st year of regular schooling. The sampling of behavior over 15 minutes in the clinical setting was to predict behavior over a much longer time. The value of this predictive instrument was compared with a standard instrument now utilized in the schools which requires several hours of administration but can be performed in groups under the aegis of a teacher. The comparative value of this neurological examination was determined in both a group of low socio-economic background and one more nearly comparable to the standard school population of a large city with a range of socio-economic variables.

It was not initially clear which of the various neurological sub-tests would be most predictive in these various populations. Several of the sub-tests did approach significant correlation in predicting school achievement as measured by reader level as well as standardized testing. The range of such correlations was not equivalent to that provided by the standardized Metropolitan Readiness test total score. A total "non-motor" score was derived which did provide adequate enhanced correlation to school performance measured at the end of the 1st year. This was true although all the sub-tests were included, including those found to be poorly predictive on an individual basis. Subsequent studies have been implemented with additional sub-tests since this initial study was performed. Additional statistical studies are also contemplated of a more sophisticated nature to determine the contribution of each sub-test to the early identification of children with probable learning problems. It would appear, however, that this 10-15 minute examination carried out under standardized scorable conditions in a clinical setting in the hands of a physician does have statistically significant predictibility. Indeed it serves to predict performance in the OEO group in a fashion at times superior to the standard testing now done. Particularly noteworthy is the correlation of .71 between "non-motor" score and actual level of performance in reading level.

An additional point to be made concerns the value of the motor examination in predicting school performance. Although this has been the traditional measure of brain function, it has not been perhaps the most relevant one. It showed essentially no correlation with eventual school performance in the OEO group. Its range of correlation in the CONTRAST group was significant at the .05 level alone. The finding that motor function is but one aspect of brain function was thus confirmed. In the higher socio-economic group,it became a more adequate predictor. In this population, the pre-requisite degrees of training in auditory and visual processing provided by the home may be more clearly related to the requirements of the classroom. Even here, however, the "non-motor" score was far superior as a measure of brain function in predicting school performance.

This initial study was concerned with the question of predictive validity of the clinical 15 minute examination in predicting school failure. Much more important would be its value in identifying the means by which the child can be more successful. To that end, additional behavioral measures have been developed for the observation of children by the teacher and psychologist concerning the channels and other conditions by which children can be successful. This would be the most relevant measure of the predictability of the clinical instrument. Correlations with these longer term observations are now being carried on.

The heuristic value of this clinical instrument in the hands of the pediatrician and school health physician lies not only in its predictive validity. The concept of measuring rate of change during a short term examination samples the very behavior that one is seeking

to predict over the longer period of the year of schooling. It makes the clinical examination a teaching session and may thus provide the child from a poor socio-economic background a fairer measure of that elusive thing called capacity for change. That is the essence of the remedial techniques exemplified by Head Start. The use of such an approach in the clinical examination might then provide the consulting physician a concept relevant to the entire goal of the Head Start program.

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A Measure for Neurological Evaluation of School-Age Children

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I. Introduction

The neurological evaluation of children on entry into school is a relevant portion of the medical examination. Brain function is what school deal with. The child with obvious retardation and cerebral palsy would have been picked up earlier by failure to meet the usual developmental milestones. A larger number of children, ranging from 10-20% of the normal population, would not have been recognized as potentially having learning problems. Some of these may been categorized as "immature" by perceptive teachers in kindergarten. However, there has been no easily administered, standardized, scorable instrument to clearly delineate the child who will need special help. These children have generally been subjected to the "trial of school". If they fail to do adequately after sometimes several years of regular schooling, referral is then made for the usual medical and psychological testing. Several years would then have elapsed with concomitant emotional difficulties secondary to the experienced failure. Remedial techniques are then less successful. Further, the several years of elapsed school attendance would have been less efficiently utilized. It is for this reason that the examination has deliberately focused on the child from 4½ to 8. It is most useful in the 5-7 group; the usual ages for school entry. Norms have been developed for various populations on the basis of age (6 month intervals), sex and background.

The routine neurological examination of children has been adapted from that of adult clinical neurology. It delineates the asymmetries of function such as hemiparesis, asymmetrical reflexes etc. which serve to identify the site of lesion in the central nervous system. This mode of examination is primarily concerned with relatively acute neurologic disease. The problems of the child with learning problems must be considered not merely in terms of

asymmetrical function but rather in terms of the level of development. The presumed causes for these developmental lags are frequently diffuse in their action. The examination of the motor system has been the traditional measure of brain function by the pediatrician and neurologist. However, the usual motor milestones may have been met within the wide range of normal. On school entry, circa 5-6, testing for motor clumsiness should focus on more complex coordinated motor skills and their discreteness. The motor examination must be scorable and standardized so that one could have agreement between relatively unskilled examiners in different localities.

Many children with significant motor clumsiness have perceptual handicaps relevant to the learning of school materials. Motor clumsiness per se is but one measure of brain function. It may indeed be essentially irrelevant to the problems of auditory and visual attention that may be more difectly applicable to the usual modes of teaching. The neurological evaluation of the child should then involve tasks utilizing the various channels which are avaialble for learning. One can then not merely delineate the level of performance in terms of developmental expectations but do so in a way which describes the selective handicaps relevant to the needs of the school for teaching.

The neurologic evaluation must be related to the developmental norms and in a fashion which relates to the modes of teaching to be used. Measures of present levels of performance, however, are a relatively static measure of the child's ability to learn. They are a function not only of his physiologic substrate but also of the previous more or less successful teaching techniques utilized by parents or teachers. A fairer estimate of brain function would involve the child's actual ability to learn. This is essentially what school is concerned with

the important additional parameter then would be the child's rate of learning of various tasks involving the different channels. The measures utilized in this instrument are an adaptation of the traditional neurologic examination. Whenever possible, these tasks have been adapted so that one measures the rate with which the child can learn the tasks. For example, in testing for position-sense one must teach the concept of "up and down". The mode of teaching has been standardized. The number of trials required for learning this concept is a measure of the child's ability to "catch on". This is what school is about and operationally defines brain function perhaps more relevantly than the usual neurological examination concerned with asymmetrical loss of position sense.

One can then describe the child or school entry in terms of the developmental level involving various channels, but in a fashion which permits a more dynamic evaluation. The diagnosis is made of "neurologic immaturity" on the basis of failure to pass on a series of tasks at a rate commensurate with circa 80-85% of the normal population of that age.

II. Procedures

A. General Procedures

The testing is done on a one to one basis. The examining room must be free from obvious distractions and reasonably quiet with adequate light. One may do the testing in any room so long as there is at least an unencumbered six foot span so that tandem walking may be performed. The child is seated on an appropriate chair and the examiner is usually seated at a desk and faces the child. Candy or other appropriate reenforcement is present and in view on the desk, but not immediately adjacent to the child. The examination has been designed to last no longer than 15 minutes. Significantly longer lasting periods introduce a significant variable. The format is designed so that one can keep the attention of almost all children, and the child's failure to pay attention is a very significant measure. The instructions are short and specific and should be followed exactly. The tasks are also designed so that the child has become trained to attend to the examiner. The earlier tasks are ones in which the child usually finds success. Reenforcements such as "good" etc. should be provided for the following of directions in the early part of the examination. The reenforcements are offered for following directions even when he does not do so correctly. The behavior of "performing" is what is reenforced. The candy serves as a terminal reenforcement and may be used earlier, if necessary. Once the child has been given the specific instructions and he does perform, one scores on what he does. One must beware of correcting the child in the process of following these instructions unless this can be reflected in the scoring.

B. Materials

The materials required are minimal.

1. A 1 $^{1}/_{2}$ inch adhesive tape may be used to form a straight line 6 feet lor and a box 18 inches on each side. The usual configuration is in the form of a flag.

(Drawn to scale $^{1}/_{2}$" = 1 ft.)

If the floor has vinyl tiles, these generally will be 9 inch squares and one would place the tape along the interface of the tiles.

2. A tape measure with clear delineation of the markings of inch intervals. We have used the Aloe Medical "Disposo-Tape" catalogue #3750, St. Louis, Mo.

3. American Optical Instrument Division AO H-R-R pseudo-isochromatic plates
   Copyright 1957 Catalogue #13398

4. Two point discriminator with 1 cm. division
   Bell and Croyden Wigmore Street London W.1, England

5. Ball point pen.

6. Toy "cricket"

C. Specific Procedures (the order follows that of the appended sample form)

The child is brought to the examining room and one should take the opportunity to make any observations which one finds relevant from the moment of entry. Handedness is usually determined on the last task when he is asked to write. The child is seated facing the examiner. One begins by asking the child, "How old are you?" "Do you have any sisters or brothers?" "What are their names?" One can utilize this time, while listening, to fill in the name and date, etc.

INTELLIGIBILITY SCORING

Intelligibility is scored on the basis of this initial speech sample described above. Score 4 is rare for children below 6 or 7. It is an absolute score based on clear, adult English speech as exemplified by the examiner. It is important here, as throughout, that the scoring not be on the level of expectation for age but rather on the basis of the actual behavior shown. Score 4 may be operationally defined as the ability to understand the child's speech without knowledge of context It may be further illustrated by hearing someone on the telephone and recognizing the sample as that of an adult.

Score 3 is given if speech is generally clear but has some slight drawling or slurring of ends of words. It should not be necessary to ask the child to repeat any words. This is the usual score for children on school entry. If one heard this sample on the telephone, one would recognize it as a child's but no knowledge of context would be required.

Score 2 is given if a child's speech requires the examiner to ask for repetition at least once; also it may be categorized as such if there is excessive local dialect with marked slurring. One would need some knowledge of context if this were a telephone conversation. If one must ask "what" then the score is 2.

Score 1 is given if the child does not or will not speak or one must ask for repetition more than twice on the initial speech sample.

FOLLOWING DIRECTIONS

INSTRUCTIONS:

The child has been seated. The instructions are given in a clear, conversational tone. They may be repeated once without penalty if he has failed to initiate the movement. If the child has been unable to initiate the movement within approximately 15 seconds after the command has been repeated, one may then point out that "this is your left hand" and request him to raise it. The aim is to initiate the behavior of following directions so that subsequent behavior throughout the test may be facilitated. These initial tasks are those which are most easily done and the requirements of attention and cooperation become greater as one goes into the latter parts of the examination. These particular tasks of following directions are not conerned merely with the child's ability to correctly identify body parts. If he, for example, on items involving the foot, toches the leg he is not scored down. If he does not know the label "elbow", it is touched on both sides and he is told "these are your elbows".

Concern is not merely with the correctness of response in an absolute sense but also with the consistency with which he appears to distinguish between the labels "right" and "left". A child may be "wrong" in identifying the right side as his left side but consistent in doing so. The child who is consistent but wrong is not at as great risk as the one who is inconsistent.

It has been easier for most examiners to write the actual response on the line alongside the direction on the evaluation sheet. As the examiner becomes more facile, the scoring may proceed coincident with the administration of the test. The scoring of each block of directions is done separately and may also be done in toto.

SCORING:

The first series of 6 directions are scored in terms of # right and # wrong. Consistency is defined in terms of the difference between the two scores with the number wrong subtracted from the number right. If, for example, the subject is correct

half the items and incorrect on the others, his performance could be that of chance alone. His consistency score would then be "0". If there are 4 right and 2 wrong his consistency score would then be "+2", (the difference between the two). The possibilities are as follows:

# right	#wrong	consistency
6	0	+ 6
5	1	+ 4
4	2	+ 2
3	3	0
2	4	- 2
1	5	- 4
0	6	- 6

FOLLOWING DIRECTIONS ON EXAMINER

INSTRUCTIONS:

The next block of four items again reflects the ability of the child to utilize the labels of "right" and "left" consistently. Since it is done on the examiner, the concept of shifting to the mirror image is also required. The directions given are "point to my left ear" etc. If he does not point to the examiner, one may repeat with "point to the left ear on me." Sometimes very young children do better with the opportunity to identify the parts on a stick figure drawing. The directions then would be "show me the left ear on this face."

SCORING:

The scoring for number right and wrong proceeds as before. Scoring for consistency also proceeds as above.

# right	# wrong	consistency
4	0	+ 4
3	1	+ 2
2	2	0
1	3	- 2
0	4	- 4

Whether the child has gotten the idea of shifting (that is, reversing labels on a person facing him) would be reflected by the consistency of the sign + or - attached to the scores in the consistency block.

Shifting is present and "S" is placed in appropriate box if

sign consistency 1st 6 items	sign consistency items 7-10
+	+
-	-

Shifting is not present and "N" is placed in appropriate box if

sign consistency score #1	sign consistency score #2
+	-
-	+

It is not possible to determine shifting if consistency score # 1 is 0. A "?" is placed in the "shift box" in this case since his original decision was unclear. A score of 0 in consistency score # 1 would indicate random behavior.

CROSSING MID-LINE

INSTRUCTIONS:

The specific behavior being tested in this task is not merely identifying the two labels "right" and "left" and doing so consistently. The task is a 2 part one and one must listen for the entire directions which involves crossing over. The first 2 items, by their nature, involve this crossing and provide a trial of learning the requirements of the entire set of 5. The first item may be demonstrated if he fails to do so when the instruction has been repeated. He is of course scored wrong on all counts if he must be shown the correct response. Once the behavior of crossing over has been established on this first item, the directions are given in the same fashion as on the previous tasks. One may repeat once without penalty. If more than one repetition is required note should be made. This is rarely required in normal children from 4 $^{1}/_{2}$ onward. One must guard against repeating the directions with emphasis on "right" and "left" but rather do so in a conversational tone without specific emphasis. One must also guard against repeating the directio

If the child has already begun to carry out the command.

SCORING:

This series of 5 directions involves 2 part commands. The actual performance should be described as the examination goes on and the scoring can be done at a later time. Each portion of the 2 part command is separately scored. One may note that the directions state the part to be touched first followed by the hand with which one is touching. The scoring of the two parts should be as in the order given for the command.

The maximum score for number right is 10. The scoring for consistency is as above; the number wrong subtracted from the number right.

The score of crossing the midline, per se, depends on the number of items in which the 2 part command has been followed with two different sides involved. This is reflected by the number of items in which the scores have been given for both parts of the command on the same side of the right-left box. For example, if the subject failed to touch his <u>right</u> ear with <u>left</u> hand, there are two possibilities. He may touch his <u>left</u> ear with his <u>right</u> hand. In this case he was incorrect but did cross over. Both scores on this command would be in the # wrong column, but crossing occurred. However, a response of touching his <u>left</u> ear with his <u>left</u> hand would be a failure to cross. This failure would be reflected by a score of correct for first half in column "right" but incorrect for second half in column "wrong." The total number of commands of crossing over which had been followed are indicated in the box so assigned.

The total score for # right and # wrong may be added. The total score for consistency may be derived by adding the consistency scores of each of the sub-tests regardless of sign. This is the total for the entire 20 items.

MOTOR SCALE

INSTRUCTIONS:

The motor scale is done following the test "Crossing the Mid-line". The child stands for items 1-14, but then sits down. It requires no materials other than a straight line six feet long and a box 18 inches on each side. The possible total score is 60. In general score 3 is given if the performance is as good as the adult examiner; score 0 if it is not done at all. Score 1 is given if it is done in small part. Score 2 is given if the performance is done in large part, but less than perfect. One must guard against scoring on any other basis than on an absolute scale. The performance is scored on the basis of what is done rather than what is appropriate for any age level.

Each action to be followed is demonstrated by the examiner along with the instructions given. If there is initial difficulty in understanding the directions, the action is demonstrated with additional verbal cues and the motions are demonstrated on the child as well. The score reflects the need for providing these additional cues and is correspondingly reduced. The directions are short and simple and should be followed almost exactly. The longer the command given, the less likely is one to be measuring motor performance per se. Almost all of the children in the age group from 4 onward were able to carry out the directions easily. The aim has been to produce a task which is purely motor in its function rather than one which is contaminated by much verbal description. The tasks were chosen to sample a wide range of motor skills with particular emphasis on more complex motor skills involving patterning and coordination. Most of the actions as outlined are quickly and simply done with good cooperation requiring about 8-10 minutes.

The time during which each action is to be performed is fairly significant and should be followed quite closely. The format is such that the child generally has success in the early tasks. One also builds on tasks which had gone before.

SCORING CRITERIA

1. & 2. STANDING ON FOOT

INSTRUCTION: YOU DO WHAT I DO. STAND ON ONE FOOT. The child is instructed to stand on one foot with the other leg flexed at the knee and with hands at his side for 5 seconds. Score 3 is given if he follows the command without falling on the first trial. Score 2 is given if he manages to follow the command and maintain position for the full 5 seconds, but will trasiently lose balance once during this time. Score 1 is given if the child has difficulty maintaining position and will touch the ground with the other foot more than once, but follows the command to some degree. Score 0 is given for failure to maintain position for any period and failure to follow command.

3. & 5. TAPPING OF FEET

INSTRUCTION: KEEP TAPPING UNTIL I TELL YOU TO STEP. In giving the directions one is not concerned with which foot he chooses first. NOW DO THE OTHER FOOT would be used as instruction for the other side. The child is instructed to tap his toe in a synchronous, rhythmic manner with the heel on the floor for 5 seconds by initial demonstration. Hands must be out of pockets etc. so that movements can be scored separately. Score 3 is given for synchronous tapping which does not break down during the period. The quality of the tapping can be compared with the examiner's. The range of a normal adult is about 20 taps/5 seconds. Score 2 is given for synchronous tapping which does not last the full 5 seconds and breaks down. The range would be 10-15 taps. Score 1 is given if the tapping

is done but not in a synchronous manner. The range is less than 10 taps. Score 0 is given if he is unable to follow directions in spite of the demonstration.

4. & 6. ASSOCIATED MOVEMENTS

These are assessed during the foot tapping, and the child is asked to take his hands away from his face or out of his pockets while tapping. The score is frequently related to the ease and synchrony of the foot tapping and is another measure of coordination involving the foot. The score 3 is given if there are no associated movements of the hands or body during the foot tapping procedure. A normal adult will have no movements at all. Score 2 is given if there are any associated movements of the hands at all but not the body. Score 1 is given if there are also associated movements of the body. Score 0 is given if these movements are so gross that the child's entire body comes into play.

7. & 8. HOPPING IN PLACE

INSTRUCTION: HOP IN THIS SQUARE (18 inches square) UNTIL I TELL YOU TO STOP (for 5 seconds). Again as in items 3 and 5, one is not concerned with which foot is used first. That is scored and then the directions are repeated: HOP IN THIS SQUARE UNTIL I TELL YOU TO STOP WITH THE OTHER FOOT.

The procedure is demonstrated by the examiner for a few hops, specifically in the square that is to be used. Score 3 is given if the hopping is done without coming down onto both feet at all (breaking pattern), and the child remains within the square for the full duration of the test. Score 2 is given if the hopping is done but he touches the border of the square or breaks pattern one time. Note that this score is given if he touches the border even once. Score 1 is given if the hopping is done but with more than one break in pattern or failure to stay within the block. Score 0 is given if he is unable to hop at all or breaks pattern several times.

9. STANDING HEEL TO TOE

INSTRUCTION: YOU DO WHAT I DO. YOU STAND ON THAT LINE WITH ONE FOOT IN FRONT OF THE OTHER AND TOUCHING. The child is instructed to stand heel to toe for 5 seconds without falling. One is concerned with establishing the bahavior of direct heel to toe apposition. This behavior is required for the next procedure which involves tandem walking. THE EXAMINER CAN DEMONSTRATE BY STANDING IN HEEL TO TOE APPOSITION ON THE SHORT LEG OF THE SQUARE USED FOR HOPPING AND THE CHILD ON THE PARALLEL LINE IN POSITION FOR LATER TANDEM WALKING. Score 3 is given if he does so on the first trial with his foot in immediate apposition to the other without falling. Score 2 is given if he requires placement by the examiner of heel to toe apposition but does not fall. Score 1 is given if after requiring placement of heel to toe by the examiner he is unable to maintain balance. Score 0 is given if he fails to follow the command at all.

10. WALKING STRAIGHT LINE, SIX FEET

INSTRUCTION: YOU DO WHA T I DO. WALK ONE FOOT IN FRONT OF THE OTHER ON THIS WHITE LINE; ONE FOOT TOUCHING THE OTHER. Note that the behavior required for these next 3 items has been established by his standing heel to toe in item #9. Move directly into item #10 from #9. The child is instructed to walk heel to toe on the line on the floor. The behavior to be observed is the fact that the feet are in apposition. Score 3 is given for following the straight line without deviation on the first trial with complete apposition of the feet. Score 2 is given if he maintains this for the major portion of the six feet or if he deviates from the line bu within the 9 inch square. (This is easily measured since most floors containing vinyl tile have nine inch squares.) Score 1 is given if he maintains this for less than half of the six feet or deviates more than 9 inches. Score 0 is given if he fails to follow the heel to toe directions in complete apposition for even part of the six feet.

11. WALKING STRAIGHT LINE, SIX FEET (EYES CLOSED)

INSTRUCTION: TURN AROUND AND DO THE SAME THING WITH YOUR EYES CLOSED.

The child is instructed to walk as above with his eyes closed Score 3 is given if he does so without deviation for the six foot length with his feet in direct apposition to each other throughout the six feet. Score 2 is given if he is in direction apposition the major portion of the six feet or deviates less than 9 inches. Score 1 is given if he is in direct apposition for less than half the 6 feet, or if he deviates more than 9 inches. Score 0 is given if he does not follow the heel to toe apposition directions at all or has eyes open.

12. WALKING BACKWARDS, SIX FEET (EYES OPEN)

INSTRUCTIONS: DO WHAT I DO. PLACE ONE FOOT BEHIND THE OTHER ON THIS WHITE LINE. The child is instructed to walk backwards heel to toe. This is demonstrated by the examiner. Score 3 is given if he walks heel to toe without deviation from the line and there is complete apposition without deviation for the entire 6 feet. Score 2 is given if he walks heel to toe without deviation from the line and there is complete apposition the major portion of the six feet or if he deviates less than 9 inches. Score 1 is given if he walks heel to toe for less than half the 6 feet, or if he deviates more than 9 inches. Score 0 is given if he fails to walk in apposition for even part of the distance.

13. & 14. TAPPING RHYTHMICALLY WITH FOOT AND IPSILATERAL INDEX FINGER, FIVE SECONDS (RIGHT AND LEFT)

INSTRUCTIONS: YOU DO WHAT I DO. TAP WITH YOUR FINGER AND FOOT LIKE MAKING MUSIC.

The child is instructed, while standing, to tap rhythmically and synchronously with the outstretched index finger on table or desk and the ipsilateral foot. This is a composite task in which the child will be penalized if tapping of the foot is done asynchronously as on items 3-6. He will also be penalized if he cannot tap synchronously with the finger or if he fails to coordinate both the finger and the foot. If he fails to use the ipsilateral foot and hand, this can be pointed out. Score 3 is given if the tapping is done quickly, without associated

movements, synchronously, and in a coordinated fashion between the finger and the foot. The same range of tapping is used as on tasks 3 & 5 -- about 15 to 20 per 5 seconds. It is done as well as the adult examiner. Score 2 is given if the foot tapping is done at the rate of about 10-15 taps/5 sec. without associated movements of the body. It may be done in the range of 1 foot tap to 2 finger taps. This is the usual pattern for the child of 6. Score 1 is given if the tapping of both the hand and the foot is done in the range of about 10 taps/5 sec. or has associated body movements comparable to score 1 on items 4 and 6. Score 0 is given if he fails to maintain both the finger and foot tapping for the full five seconds and has very marked associated body movements.

15. & 16. TOUCHING NOSE ON THE RIGHT AND LEFT.

INSTRUCTIONS: TOUCH YOUR NOSE, THEN MY FINGER. The child is instructed to touch the index finger of the examiner and then his nose. It is demonstrated by the examiner moving the child's arm 3 times so that he has the set from the child's nose to the examiner's index finger. There are three positions at which the examiner's index finger will be moved and this is a measure of eye motor coordination. He is to explicitly touch the tip of his nose and the tip of the index finger of the examiner. If he fails to touch both explicitly, he is shown once again. Score 3 is given if he follows the directions explicitly and manages to carry them out in all three trials. The movement must be a regular one, smooth and well-coordinated, without any tremor and done as quickly as an adult. Score 2 is given if he carries out these directions explicitly but has any slowness but no tremor. (Most children about six years old do not receive higher than a score of 2.) Score 1 is given if there is any tremor or he does not touch the finger to nose explicitly on one of the trials even after additional instruction. Score 0 is given if he fails to follow directions or has gross tremor.

17. & 18. RAPID ALTERNATING TOUCHING OF FINGERTIPS ON THE RIGHT AND LEFT

INSTRUCTION: WATCH ME, TOUCH EACH FINGER AND THEN GO BACKWARDS. Child is instructed to touch each finger alternately with the thumb, starting with the first finger and then reversing, starting again with the fifth finger. The tasks is demonstrated along with the verbal instructions. The behavior to be scored is speed and discreteness of movement. If the child fails to get the idea of reversing, one can demonstrate again. The scoring, however, is primarily of the movement rather than following directions.

Score 3 is given if he follows the direction on the first trial, touching each finger alternately and it is done as quickly as the adult examiner. It should take 2-3 seconds. There should be no associated movements of the fingers of the opposite hand. Score 2 is given if he needs an additional demonstration to get the idea of reversing. It is also given if he touches each finger alternately and separately even if there are some mild associated movements of the fingers of the opposite hand. It should take in the range of 3-6 seconds. (Most children about 6 years will be unable to get more than a score of 2.) Score 1 is given if he touches each finger and gets the "set" of the task but does so quite slowly and clumsily. It is also given if he requires additional demonstration by the examiner's passively moving the child's fingers. The associated movements of the opposite hand may be quite gross. It should take in the range of 6-10 seconds. Score 0 is given if he does not get the "set" of the task which involves touching each finger separately and also the process of reversal, even after the passive demonstration of the finger movements are done by the examiner.

19. RAPID LIP MOVEMENTS

INSTRUCTION: WATCH ME. DO WHAT I DO.

Child is instructed to alternately open and close his lips quickly for five seconds observing the examiner. Score 3 is given if it is done quickly without breakdown of synchrony and is done in a rapid, smooth fashion without associated movements. The rate should be 15-20 movements in 5 seconds. Score 2 is given if

it is done in a relatively quick fashion (about 15-20 movements) but there is slight associated movement of face or it is done at a rate of less than 15 movements without associated movements. Score 1 is given if it is done less quickly but with associated movements. Score 0 is given if he is unable to do the task.

20. TONGUE MOVEMENTS

INSTRUCTION: YOU DO WHAT I DO.

Child is instructed to do rapid side-to-side movements of the extended tongue after observing the examiner. Score 3 is given if he does so quickly (at the rate of about 10), with rapid alternating movements of the tongue without associated movements of the face. Score 2 is given if there is rapid movement (about 10) with slight associated movements of face or slight breakdown in the synchrony and the rate is 5-10 but no associated movements. Score 1 is given if there is slowness (5-10) to the movements and associated movements of the face and jaw. Score 0 is given if he is unable to do the task or if there are marked associated movements of the entire head or body.

OPTOKINETIC NYSTAGMUS

INSTRUCTIONS:

With the child seated, optokinetic nystagmus is elicited as a measure of the ability to fixate on instruction. It is a normal phenomenon and can be elicited in new borns depending upon the grossness of the input. We are using a standard tape measure for this purpose. It is considered to be a measure of general attention or visual attention.

The tape is held so that no numbers are visible. It is held approximately 18 inches from the child. The child is told 'Watch the numbers go by. The tape is exposed from left to right and then in the opposite lateral directions; then from down to up and up to down.

SCORING:

Score 2 is given for each direction if nystagmus is elicited on the first trial. The nystagmus may just be a few beats and no attempt is made to quantitate it. If it is not present, then the maneuver is repeated. Score 1 is given if he gets it on the 2nd trial. Score 0 is given if nystagmus is not elicited on 2nd trial. The maximum score is 8 for the four directions.

It is important that following of the tape without actual beats of nystagmus not be scored as nystagmus.

FACE-HAND TEST

This is a task in which the child is required to learn to pick up two stimuli when they are applied to the face and hand. It is a measure of learning and trials are provided. The scoring reflects the number of triais required. Initial cues are given and the directions should be followed closely.

INSTRUCTIONS:

The subject is seated facing the examiner. He is told "Put your hands on your lap" (with palms down). His eyes are open. One gives the following instructions as one demonstrates: "I am going to touch you in two places. . . watch me. . .Show me where I touch you." With his eyes open and palms down on knee, touch is quickly but definitely applied to the dorsal surfaces of both hands simultaneously. The intensity of the touch should be a light fubbing movement. "Where did I touch you?" Several trials may be necessary before one has achieved the requisite behavior of the child pointing to both the stimuli applied. One must teach these behaviors before going on. It rarely requires more than 3 trials. If it does, then it in itself is a measure of failure to get even this simple pattern and the score is 0 for the entire task.

He is then told "close your eyes". Touch is simultaneously applied to the cheek and contralateral hand. The two stimuli should be of the same intensity. The absolute intensity is not important but their similar value is important. 'Where did I touch you? Show me." He must point to the parts stimulated. This is repeated with touch to the other hand ans ipsilateral cheek, the the first hand and ipsilateral cheeck, the the other hand and contralateral cheek. One is then alternating hands.

SCORING:

Score 3 is given if he has correctly indicated the stimulus to the hand as well as the face consistently within this initial series of 4 trials. He must identify touch in both places on at least two instances during the series of 4.

If he has not pointed out the two stimuli, hand as well as face; or has picked up two stimuli but mistakingly attributes them to both sides of the fact (displacement) further trials are provided.

At this time, as initially, he is again touched on the dorsum of both hands. THE EYES ARE CLOSED HOWEVER. He is thus getting another cue that touch will be applied to two places and can be applied to the hand. He is asked "Where did I touch you?" It is rare for a child to fail to pick up these two hand stimuli if the initial instructions are followed. One may say once "did I touch you and where else" if he identifies only one stimulus. If he fails, he has not learned the initial patterns adequately and he again is scored 0.

Once again as with the initial series of 4 trials he is touched on the hand and cheek, ipsilateral and contralateral. The eyes are closed.

Score 2 is given if he consistently picks up the two stimuli during this second series of four trials. (At times, the child will identify two stimuli on the face and hand on the first trial after being given the repeat cue, but does not maintain this ability.)

If he fails to pick up the required stimuli on the face and hand within this second series of 4 trials, another series is given. THIS TIME THE EYES ARE OPEN. No additional cues are provided as had been prior to the first and second series.

Score 1 is given if he learns within this 3rd series of 4 trials given with his eyes open.

Score 0 is given if he does not learn even with his eyes open.

SOUND-TOUCH TEST

This is a clinical attempt to measure auditory distractibility.

INSTRUCTIONS:

The child is presented with a sound by snapping the fingers on one side of the head, close to the ear but not touching. A "cricket" noisemaker may be used at approximately 12 inches from the ear to simulate the snapping of fingers. He is told "This is a sound... Sometimes I am going to touch you and sometimes I will not. Tell me when I touch you." Again he is asked to close his eyes and the snapping is repeated. "Did I touch you?" If he understands, he will say "no". If he points to the ear stimulated as being touch, he is again told that this is not a touch but a sound. "Tell me when I touch you."

With eyes closed, sound is again applied to the ear and touch lightly but firmly applied to the dorsum of the opposite hand. Again, as with the face hand test, a light rub is used. "Did I touch you?" He should point to the part touched. Sound is similarly applied to the opposite ear and touch to the contralateral hand.

SCORING:

Score 3 is given if he identifies the touch on the hand during these first two trials. He may fail to do so initially but the score of 3 is given if he gets the touch by the second trial.

If he fails to identify touch on the hand, he is provided additional cues that touch will be applied. Touch is applied to the contralateral FACE along with sound to the ears. Once again he is asked "Where did I touch you?" If he fails to pick up touch on this set of 2 cues, his score is 0.

If he does pick up touch on the face, he is given a single trial of sound alone. "Did I touch you?" This is to break up any perseveration. He is then given the second series of trials of sound to the ear and touch to each of the contralateral hands.

Score 2 is given if he idenifies the touch on the hands during this 2nd set of 2 trials.

If he has failed to tune out the sound and has not picked up the touch on the hand, it is repeated WITH EYES OPEN.

Score 1 is given if he identifies touch on the hand when it is applied along with sound to the ear WITH EYES OPEN.

Score 0 is given if he fails to do so.

POSITION SENSE TESTING

Position sense testing is traditionally used as a measure of possible posterior column disease. The aim here, however, is to teach "up and down" in a scorable standardized fashion. One then has another clinical opportunity to measure the child's rate of learning.

INSTRUCTIONS:

This may be done unilaterally or bilaterally as a measure of possible position sense difficulties. It has generally been done unilaterally using the 5th finger of the right hand. The usual procedure is followed for testing. One must caution that the examiner grasp the distal portion of the 5th finger with his fingers parallel to the digit.

The child is asked to look at his finger. The examiner demonstrates while saying "This is up and this is down. . .Now close your eyes." With eyes closed, the child's distal portion is bent up. "Is it up or down?" If he correctly identifies it as up, then it is brought back to neutral and then again up, followed by down. If he correctly identifies the finger's position after the first teaching trial, score is 4. If he does not, the initial demonstration is repeated with eyes open. Once again one tests it in a similar fashion. The score then reflects the number of demonstrations required. A total of 4 demonstrations are provided and the score diminishes with the number of demonstrations. The score 0 is given if he is incorrect even after the fourth demonstration.

TWO POINT DISCRIMINATION

As with position sense testing, two point discrimination is a measure that is used for picking up asymmetries of function. However the rate of learning of the concept of "one and two" may be considered to sample behavior that is relevant to the learning of simple number concepts. Further, it provides another opportunity to sample, in the clinical setting, how rapidly the child catches on.

INSTRUCTIONS:

The procedures used are similar to those used clinically. It again may be done unilaterally or bilaterally. If one is not conerned with possible asymmetries of function, one may limit oneself to unilateral testing. It is usually done on the distal portion of the 5th finger on the right hand.

The child is shown with his eyes open: "This is one and this is two. . . (The distance between the two points is no less than 1 cm. in the 6 year old.) As with position sense testing, the child is instructed to <u>close</u> his eyes. One point is given. "How many points do you feel? One or two?" One point is given again followed by 2 points. If he fails to get the concept, the demonstration is repeated. The number of demonstrations required then is reflected in the scoring. A maximum of 4 demonstrations are given. As in position sense testing, failure to learn after 4 demonstrations provides a score of <u>0</u>.

VISUAL FIGURE GROUND

The AO H-R-R plates have been used for this task as an example of the ability to see figures despite a confused background. The aim is to provide a measure of visual perception that follows, as before, an opportunity to learn the task.

INSTRUCTIONS:

The AO H-R-R plates are opened to the 1st plate and held in adequate room light about 18 inches from the child. He is told, as the examiner demonstrates, "trace with your fingers what you see here". The tracing of the several figures separately that appear on each page must be taught if it is not already known. There is no time limit to the first 3 sample plates.

One then goes on to have the child trace the figures already learned on the next series of 3 plates. Fifteen seconds is given for each plate. If he fails to see the second figure he is asked, "Is there anything else there?"

SCORING:

The child is scored on the basis of tracing the general configuration and not on the quality of the motor performance. On the triangle, the child's failure to trace the third side is scored as wrong.

Each figure which is not traced accurately on the three test plates reduces the score by 1. The maximum possible score is 6. The proceudre has been to check the sq.uare in which the child does not perform accurately.

TACTILE FIGURE WRITING

This is again an adaptation of the standard neurological examination. Difficulty with figure writing may be considered, if asymmetrical, a measure of more complex sensory loss. The task provides an opportunity to trace the simple geometric forms which had previously been taught on the visual figure-ground task. It is conveniently done on the rear of the 3rd page of the form or on a separate sheet of paper. A series of trials is again provided.

INSTRUCTIONS:

The child is given a pen to hold. "Take the pen in your hand...close your eyes.....you write on this paper what I write in your hand." This is usually done with the pen in hand and therefore usually done in the left palm if he is right handed. One may determine handedness on this test by the hand he chooses to use. If it is done bilaterally, one should allow for equivalent elapsed time between the administration of the stimuli and the actual drawing of the figure.

His eyes are open while writing on the paper.

A straight line is drawn on the child's outstretched palm. He then writes it on the paper. One then traces a circle, cross, and then triangle in that order. In tracing the triangle, one places the base at the proximal portion of the palm.

If the child fails to trace the figure accurately, he is given up to three trials per figure. Addition of extraneous lines or failure to close the triangle is scored as a failure.

SCORING:

A total of 12 points is possible. A child will rarely fail to draw the straight line.

Score 3 is given for each of the 4 figures which are drawn on the 1st trial.

Score 2 is given for each drawn on the 2nd trial.

Score 1 is given for each drawn on the 3rd trial.

Score 0 is given for each that is not drawn accurately by the 3rd trial.

(FORM A)

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NEUROLOGICAL EVALUATION

Name_____ Center_____ Date Tested Year Month Day ___ ___ ___

Sex M_____ F_____ Handedness R__L__ Examiner_____ Birthdate ___ ___ ___

Age _____ ___

Interaction with examiner (Conditions of testing, level of distractibility, cooperation, and general appearance.) (How old are you now? Do you have any brothers or sisters? What are their names?) Intelligibility 1----2----3----4

Following Directions:

On Subject:	Correct	Incorrect
1. Show me your left hand		
2. Show me your right leg		
3. Show me your left eye		
4. Show me your right ear		
5. Show me your left leg		
6. Show me your right hand		

Consistent	# right	# wrong

On Examiner:		
7. Point to my left ear		
8. Point to my right eye		
9. Point to my left hand		
10. Point to my right knee		

Consistent	# right	# wrong

Shift ☐

Crossing the Midline

	1st	2nd	1st	2nd
11. Cross your left leg over your right knee				
12. Touch your left elbow with your right hand				
13. Touch your right ear with your left hand				
14. Touch your left foot with your right hand				
15. Touch your right knee with your left hand				

Consistent	# right	# wrong
TOTAL →		

Cross midline ☐

MOTOR SCALE (A)

ALL ACTIONS ARE TO BE DEMONSTRATED.
"DO AS I DO" PRECEDES ALL ACTIONS.

	3	2	1	0
1. Standing on right foot. (5 sec.) "DO AS I DO: STAND ON ONE FOOT."				
2. Standing on left foot. (5 sec.) "NOW STAND ON THE OTHER FOOT."				
3. Tapping right foot. (5 sec.) "DO AS I DO: KEEP TAPPING UNTIL I TELL YOU TO STOP."				
4. Associated movements of hand and body.				
5. Tapping left foot (5 sec.) "DO AS I DO: KEEP TAPPING UNTIL I TELL YOU TO STOP."				
6. Associated movements of hand and body.				
7. Hopping in place, right foot (5 sec.) "HOP IN THIS SQUARE UNTIL I TELL YOU TO STOP."				
8. Hopping in place, left foot (5 sec.) "HOP ON THE OTHER FOOT."				
9. Standing heel to toe (5 sec.)(place if necessary) "STAND ON THAT LINE, ONE FOOT IN FRONT OF THE OTHER."				
10. Walking straight line (eyes closed) "WALK DOWN THAT LINE, ONE FOOT IN FRONT OF THE OTHER."				
11. Walking straight line (eyes closed) "TURN AROUND AND DO THE SAME THING WITH YOUR EYES CLOSED."				
12. Walking backwards, 6 feet "PLACE ONE FOOT BEHIND THE OTHER WITH YOUR EYES OPEN."				
13. Tapping rhythmically with feet and finger (R) (5 sec.) "TAP WITH YOUR FINGER AND FOOT, LIKE MAKING MUSIC."				
14. Tapping rhythmically with feet and finger (L) (5 sec.) "NOW WITH THE OTHER HAND AND FOOT."				
15. Touching nose, three times (R) (repeat demonstration twice) "TOUCH MY FINGER, THEN YOUR NOSE."				
16. Touching nose, three times (L) "NOW WITH THE OTHER HAND."				
17. Rapid alternating touch of fingertips (R) "TOUCH EACH FINGER, THEN GO BACK."				
18. Rapid alternating touch of fingertips (L) "NOW WITH YOUR OTHER HAND."				
19. Lip movements: demonstrate rapid lip movements "DO THIS WITH YOUR MOUTH."				
20. Tongue movements: demonstrate rapid tongue movements "NOW THIS."				

Total Score _____

SENSORY TESTING

1. Optokinetic Nystagmus
"Watch the numbers as they go by."
(repeat on each trial)

8	7	6	5	4	3	2	1	0

2. Face-hand test
"I'm going to touch you in two places. Where did I touch you? Good. Close your eyes. (Touch) Where did I touch you?"

	Eyes closed		Eyes open	
Score →	3	2	1	0
Following cue →	1	2	3	incorrect

3 Sound-touch test
"This is a sound. Sometimes I'm going to touch you and sometimes I'm not. Close your eyes. (Sound) Did I touch you? No. That was a sound. (Sound & Touch) Did I touch you?"

	Eyes closed		Eyes open	
Score →	3	2	1	0
Following cue →	1	2	3	incorrect

4. Position sense
"This is up and this is down. Close your eyes. It this up or down?"

Score →	4	3	2	1	0
Following cue →	1	2	3	4	incorrect

5. Two-Point discrimination
"This is one and this is two. Close your eyes. Is this one or two?"

Score →	4	3	2	1	0
Following cue →	1	2	3	4	incorrect

6. Visual figure-ground
"Trace with your finger what you see here." (Demonstrate)

Samples			Test plates					
0	X	△	0	1 X	0	2 △	X	3 △

score- ☐

7. Tactile figure-writing
"Take the pen. I'm going to write something on your hand and you write it on the paper. Close your eyes."

score- ☐

	1				0				X				△			
Score →	3	2	1	0	3	2	1	0	3	2	1	0	3	2	1	0
Following cue →	1	2	3	inc	1	2	3	inc	1	2	3	inc	1	2	3	inc

Appendix II

SCHOOL DATA

NAME_____ DATE_____

SCHOOL_____ GRADE_____

TEACHER_____

1. Current School Placement (check one)

First Grade, "advanced"	_____
First Grade, "regular"	_____
Transition Class	_____
Junior Primary	_____
Kindergarten	_____
Other: (Describe)	

2. Teacher Recommendation for Placement Next Year (1967-1968) (check one)

Promoted, "will do well"	_____
Promoted, "average"	_____
Promoted, "with reservation	_____
*Retained	_____
Other: (Describe)	

* If retention recommended, what is major factor involved?_____

_____

_____

_____

3. Teacher Evaluation of Reading Level

(a) If test score available, please note along with name of test (e. g., Informal Reading Inventory).

Score_____

Test_____

(b) What book is child currently reading in? What is his level of instruction? (Examples: First reader; primer; 3rd pre-primer; readiness level; etc.)

_____